REPORT OF RESULTS OBTAINED IN THE TREATMENT OF UNUNITED FRACTURES WITH THE PARKHILL CLAMP.

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NINE cases of perfect union out of fourteen cases operated for ununited fractures encourages me to report my experiences with the Parkhill clamp. In 1897 it was my good fortune to be present at operations in Denver, Colorado, when Dr. Clayton Parkhill commenced using his bone-clamp for the treatment of ununited fractures. As I was about to depart for Africa, Dr. Parkhill afforded me abundant opportunity for observing the results obtained in cases upon whom this clamp had been used. He also presented me with a complete clamp, and later, while in London, I had two smaller sets made. The largest size I have used for operations on the femur, the second size for the tibia and humerus, the third size for the fibula, radius, and ulna.

This instrument has been fully explained and illustrated in the ANNALS OF SURGERY, of May, 1898. Since my return from West Africa I have learned from Dr. Parkhill that he has been using a steel pin as a guide when drilling holes in the bone, so that the second hole drilled may be parallel to the first. I consider this steel guide of much help and, therefore, of value. In my first two cases I had considerable difficulty and delay, owing to the fact that I did not drill the holes parallel, and changes had to be made which prolonged the operation beyond the time necessary. I also regret that I did not have the clamps silver-plated; had this been done, the antisepsis would have been more thorough and the instruments better preserved from rust in the damp atmosphere of Western Africa. In every case where I succeeded in accurately adjusting the

clamp I found perfect fixation of the parts, excepting those cases suffering from specific or tuberculous disease.

The fourteen cases here reported were all males, belonging to different tribes of the Bantu family of negroes in German and French West Africa. The age obtained from these patients is always approximate. The fourteen cases which I operated are herewith reported in brief.

CASE I.—Fracture of left humerus. M. B., aged twenty-five years. One year before seeing me the patient had been struck with an axe-handle over the left arm, causing a fracture of the humerus in its lower third. This fracture was comminuted, and a small sinus had formed, from which pus could be pressed. Fibrous union existed. Operated July 9, 1897. Upon cutting down to the bone two small fragments were found and removed. Fibrous union separated and ends of bone resected. Parkhill bone-clamp applied, second size being used. The uprights were not parallel and new holes had to be drilled. No plaster-of-Paris. To control the patient was impossible, or to keep him clean: he removed the dressings on every possible opportunity for the purpose of showing the projecting portions of the clamp to his friends, and to explain how brave he was in permitting a white man to "put him asleep and cut him." One day he disappeared in the bush; he returned in five days with all dressings off, but the clamp in position; the wound was badly infected. The patient excused himself to me by explaining that he "washed it daily in a forest stream." New dressings were applied, but the infection persisted. Finally, the patient insisted upon the clamp being removed. Union had not taken place. Patient departed to his home.

CASE II.—N., aged sixteen years. Recent fracture of right femur. Patient slipped while walking along a fallen tree in the forest. Fracture at junction of upper with middle third. Operated July 26, 1897. Oblique section of ends. The Parkhill clamp, large size. Silkworm-gut sutures were used to close wound. The limb was kept in a fracture-box, clamp removed at end of fifth week. Good union. Used one crutch for three weeks and left hospital with crutch. This patient was seen four months later at a town nearly ninety miles from his home. He had walked the entire distance with his father, and had not used any support except a light native throwing-spear.

CASE III.—M. Z., aged twenty-six years. Pseudarthrosis of the left humerus. Patient had been shot in a palaver (tribal war) in

January, 1896. A compound comminuted fracture existed at the upper fourth of the bone. The soft parts had been badly damaged and infected and a running sore existed. Operated August 9, 1897. Two pieces of iron pot and one small stone (native bullets) were removed. Ends resected transversely, the Parkhill clamp applied. Wound sutured with silkworm-gut; gauze drain. Drain removed third day. Dressings changed, wound healing nicely. Plaster-of-Paris dressing. Clamp removed at end of fifth week. Good union; very useful arm.

CASE IV.—A man belonging to the Benga people, living on Corisco Island, aged twenty-five years, was brought to my hospital. An examination revealed an ununited transverse fracture of right femur in its middle third. Bone fractured in February of same year. The tilting of the upper fragment upward was very marked and caused considerable pain. Operated September 20, 1897. Free incision. Adhesions were cleared away, ends of bone sectioned transversely, and clamp fixed in position. Wound sutured. After applying dressings, the limb was well protected with wadding and then enveloped with plaster bandages and placed at rest in an ordinary fracture-box. Case removed on fifty-sixth day. Perfect union. Patient rested quietly in his town two months, and then went on a hunting trip in the forest.

CASE V.—Male, Bulu tribe, aged forty years. Malunion of left tibia. Patient was badly infected with syphilis; the nasal bones having already collapsed. He had several syphilitic sores. For several days I refused to operate him; but he pleaded so hard for operation that I finally consented, and on October 26, 1897, applied the Parkhill clamp, after sectioning the fibula. Patient placed on anti-syphilitic treatment. Clamp removed at end of fifth week. No union whatever.

CASE VI.—Male, Mabeya tribe, aged thirty years. Ununited oblique fracture of right femur at junction of upper and middle third. This patient was in a very similar condition to Case V. He was badly infected with syphilis, and was also suffering from pulmonary tuberculosis. Examination of his sputum revealed large numbers of tubercle bacilli. For the restoration of the fractured bone the Parkhill clamp was applied November 4, 1897. Patient did not do well; considerable fever developed, and his pulmonary distress increased from date of operation. The anæsthetic (ether) undoubtedly caused the marked bronchial irritation experienced the first three days after operation. It became necessary to remove the clamp on the thirty-fourth day. No union.

CASE VII.—Boy, aged fifteen years. Fracture right humerus Two weeks' standing. Operated November 20, 1897. Clamp applied. No unusual occurrence. Clamp removed thirty-nine days after operation. Perfect union. This patient seen constantly for months after operation.

CASE VIII.—Female, Bulu tribe, aged thirty-six years. Pseudarthrosis of right humerus. The bone was fractured in its lower third, from a blow inflicted by her husband with a heavy wooden club, used for pulverizing cassava (native food). November 25, operation. Clamp applied. All dressings removed December 30. Perfect union.

CASE IX.—Male, aged forty-five years, Benga tribe. Recent compound comminuted fracture of left humerus, caused by a gunshot wound, December 6, 1897. Fragments of bone removed. Ends of fractured bone resected. Wound thoroughly cleansed with antiseptic solution and clamp applied. January 20, 1898, clamp removed; a very good result; union complete.

CASE X.—Male, aged thirty-five years, Benga tribe. Two years before presenting himself for operation, this patient, while working on a coasting steamer, fell through an open hatchway and sustained an oblique fracture of the right femur at the lower and middle third junction. He left the ship and was treated by a native doctor. Very marked malunion existed. January 25, 1898, I operated this man. It was necessary to use the chisel to separate the malunion. The ends of the fractured bone were then sectioned. The large size clamp was used, and the tissues sutured around the instrument as practised by Dr. Parkhill. This limb was put up in precisely the same manner as Case IV. Although there was considerable reaction following the operation, the patient went on comfortably, and dressings and clamp were removed at end of the sixth week. Union was perfect, and patient, when last heard of, was again working on a steamer.

CASE XI.—Male, Fang tribe (a witch doctor), aged twenty-nine years. This patient had been shot in a palaver, and sustained a compound comminuted fracture of right humerus in the lower third very close to the elbow. The patient was also suffering with syphilis. Operated April 2, 1898. He took the anæsthetic very badly, and was kept under with difficulty. The fracture was so near the elbow-joint (about one inch and a quarter) that the clamp was adjusted with difficulty, and the final adjustment was not correct. No union was obtained after waiting thirty-two days.

CASE XII.—Male, Bakele tribe, aged twenty-eight years. Compound fracture of femur in upper third. Upper portion of the bone

projected through the septic wound, maggots were crawling out of the medullary canal. The stench from the wound was very bad; altogether it was a horrible sight. Two days previous to operation this bone and wound were very thoroughly cleansed and repeatedly injected with antiseptic solution. Operated April 5, 1898. Large size clamp used. The result was very satisfactory. Absolute union was obtained by end of eighth week.

CASE XIII.—Male, aged twenty years. Fracture of right tibia at junction of upper and middle third. (Patient suffering with pulmonary tuberculosis.) Operated April 21, 1898. The second-size clamp was used. At end of sixth week no union.

CASE XIV.—The last case I had the privilege of operating upon for ununiting fracture in Africa was that of a Yungvol man, aged twenty-two years. The patient had received a full charge of shot (broken old iron pot) in the right arm, resulting in a compound comminuted fracture of the humerus in its upper third. The wound needed careful antiseptic treatment for six days prior to operation. Operated May 2, 1898. The fragments were sectioned transversely, second size clamp used, rubber drainage-tube inserted and wound closed. Drainage-tube removed second morning. Patient did very well. A sharp attack of tertian malaria kept him back, but perfect union was obtained by end of tenth week.

To bear testimony relative to the efficiency of this bone-clamp is to me a sincere pleasure, for, situated as I was in a far-off uncivilized land, having to work under most disadvantageous conditions, and with absolutely untrained assistants, the results obtained with this instrument for the restoration of fractures was, to say the least, extremely gratifying. I found that where properly applied, and all other conditions being equal, the clamp fulfils all Dr. Parkhill claims for it,—*i.e.*, it is easy of adjustment. After proper adjustment, motion between the fragments is not possible.

In operations conducted in strictly aseptic lines the risks of infection are extremely small; and lastly, but by no means of least importance, obviate the necessity of secondary operation.